

A further study of the behavioural patterns of five species of British butterfly whilst in copula

Between 1995 and 2005 I have been fortunate enough to five species of British butterfly in copula. I now describe their behavioural patterns. This follows my earlier observations on twelve other species (Knill-Jones, 1989. *Br. J. ent. Nat. Hist.* 2: 139-141; 1995. *Br. J. ent. Nat. Hist.* 8: 7-10).

Dingy Skipper *Erynnis tages* L. (Hesperiidae)

23 May 1995 was a warm & sunny day with a temperature of about 20°C, when my Mother and I decided to go to the chalk pit on Compton Down to observe the butterflies there. I had not been there long when, at 13.50 hours, I noticed a pair of Dingy Skippers *in copula* that had settled on the tip of a dead stem. The female was freshly emerged and faced upward in a north-westerly direction and its more worn mate faced down the stem towards the south-east. Both had their wings open with the female (each wing) held at an angle of 45 degrees and the male at 60 degrees. Throughout the whole time that they were *in copula* their wings remained open, with the female opening them from a minimum of 5 degrees to a maximum of 60 degrees and the male from 30 degrees to having them fully open at right angles at 14.15 hours, just prior to separation.

Except for noticeable movement of the male's abdomen they did not change their positions on the stem except with the slight opening and closing of their wings. At 14.16 hours there was considerable movement up and down the stem as they tried to separate. At 14.17 they separated and both flew off at the same time before alighting on nearby plants with their wings fully open. It was observed that the female was the more passive partner. They had been *in copula* for 27 minutes, which compares to 32 minutes for the Grizzled Skipper (*Pyrgus malvae* L.) although in neither case was the actual mating witnessed.

Small Blue *Cupido minimus* (Fuessly) (Lycaenidae)

2 May 1995 was a very warm and sunny day when my Mother and I decided to go to the chalk pit on Compton Down to see if there had been an early emergence of the Small Blue. At 12.08 hours, I noticed a pair *in copula* which had just mated alighting on a piece of Goose-Grass *Galium aparine*. The male, being slightly larger, faced north with each of its wings held at an angle of 45 degrees and the female faced south with its wings tightly closed. At 12.12 hours the male closed its wings for about thirty seconds before opening them again. At intervals of about ten minutes the male likewise closed its wings briefly; the wings of its mate were closed during the whole time whilst they were *in copula*. This continued until 12.49 hours when they both closed their wings remaining like this until separation took place. At 12.19 hours, there was slight leg movement in the female and this was repeated on a couple of occasions. At 12.12 they changed their positions with the male facing south-west and the female south-east; at 12.22 they moved back to their original positions of north and south. At 12.43 they moved slightly to alter their positions with the male facing north-west and its mate south east. At 12.49, with their wings closed,

they moved and both faced north; at 12.57 they moved down the stem, with the male above, and they both faced in a westerly direction. At 13.07 there was considerable movement and a minute later they separated, when the male opened its wings and flew off. The female opened its wings fully and dispersed thirty seconds later.

They had been in copula for exactly an hour; this is twice as long as *Polyommatus icarus* (Rott.) and half the time of *Lysandra coridon* (Poda). I saw about a dozen in all of this butterfly during this very forward spring and I also observed a second pair nearby *in copula*. I noticed that the male carried the female whilst in flight.

Brown Argus *Aricia agestis* (D. & S) (Lycaenidae)

It was a warm and sunny morning on 20 May 2001, when I decided to go to Afton Down to observe the butterflies there. At 10.15 hours I noticed a pair of *Aricia agestis in copula* on a blade of grass. The male was facing due east and the female faced north-north-east. Both of their wings remained tightly closed whilst they were *in copula*. Their bodies pulsated rhythmically all the time whilst sperm was being passed to the female. At 10.43 there was considerable movement although their wings remained closed before they separated and flew off together. Only a foot away I observed a pair of Dingy Skippers *Erynnis tages*, also *in copula* which, unlike *A. agestis* had their wings fully open to the sun. These were still *in copula* when I left after thirty minutes. The pair of *A. agestis* had been *in copula* for 28 minutes although the actual mating was not observed.

Adonis Blue *Lysandra bellargus* Rott. (Lycaenidae)

7 June 2005, turned out to be a lovely sunny day heralding the beginning of Summer and I went to the chalk pit on Aft on Down to observe there. At 14.15 hours I noticed a pair of Adonis Blues *in copula* on a blade of grass. Both had their wings closed with the female facing south and the male facing north. A few minutes later the male opened its wings at 45 degrees facing north-west and its mate slightly opened its wings at 10 deg. At 14.20 they moved slightly and closed their wings with the male facing east and the female facing west. The female was in a horizontal position while its mate was vertical. At 14.23 the male opened its wings to 45 degrees while the female had its wings closed. At 14.24 they moved a foot up a grass stem; both had their wings closed with the female facing west and the male facing south-east. At 14.25 they moved several inches onto a Bramble leaf. The female had its wings open at 45 degrees facing east and its mate was facing west with closed wings. At 14.32 they moved several inches and both had their wings closed with the female facing east and the male facing south west. At 14.25 they moved again with the female facing south and the male facing north with both wings closed. At 14.40 there was more movement and the male opened its wings facing south and the female faced north-west with closed wings. At 14.41 they moved to grass stem with the male facing south-east and the female facing west with both wings closed. At 14.43 they moved and the female opened its wings to 45 degrees, facing west and the male faced south-east with closed wings. Two minutes later the female closed her wings. At 14.57 they moved to a bramble leaf with both wings closed. At 15.00

hours, both wings were closed with the male facing south-east and the female facing north-west. At 15.01 they moved and had their wings open briefly. At 15.06 they moved down a grass stem with both wings closed and then moved up the stem where they both briefly opened their wings to 45 degrees. At 15.11 they separated, with the male flying off first shortly followed by its mate. It was noticed that the male carried the female whilst in flight. They had been, *in copula* for at least 56 minutes.

Date	Species	From	To	Duration (hours: minutes)
17 Apr 1989	<i>Pararge aegeria</i> (L.)	12.00	12.05	0: 05
23 May 1985	<i>Erynnis tages</i> (L.)	13.50	14.17	0: 27
20 May 2001	<i>Aricia agestis</i> (D.& S.)	10.15	10.43	0: 28
19 Sep 2001	<i>Polyommatus icarus</i> Rott.*	11.54	12.25	0: 31
13 May 1984	<i>Pyrgus malvae</i> (L.)	12.28	13.00	0: 32
7 Jun 2005	<i>Lysandra bellargus</i> (Rott.)	14.15	15.11	0: 56
2 May 1995	<i>Cupido minimus</i> Fuess.*	12.08	13.07	1: 00
16 Aug 1997	<i>Coenonympha pamphilus</i> (L.)	15.11	16.12	1:01
4 Aug 1991	<i>Thymelicus sylvestris</i> (Poda)	11.23	12.36	1: 13
3 Aug 1994	<i>Maniola jurtina</i> (L.)	15.05	16.25	1: 20
7 Jul 1984	<i>Melanargia galathea</i> (L.)	10.45	12.20	1: 35
28 Jul 1981	<i>Pyronia tithonus</i> (L.)	15.22	17.05	1: 40
12 Sep 1984	<i>Pieris rapae</i> L.	16.30	18.15	1: 45
27 July 1984	<i>Lysandra coridon</i> (Poda)*	10.40	12.45	2: 05
31 May 1984	<i>Callophrys rubi</i> (L.)	11.48	14.25	2: 57
26 Sep 1983	<i>Lycaena phlaeas</i> (L.)*	11.35	14.40	3: 05
11 Jun 1994	<i>Melitaea cinxia</i> (L.)*	10.39	14.34	3: 55

Table 1. Duration of copulation of butterflies.

Small Heath *Coenonympha pamphilus* (L.) (Nymphalidae)

On a sunny, but rather misty afternoon on 16 August 1997 my Mother and I went to the chalk pit at Afton Down to observe the butterflies. At 15.11 I disturbed a pair of *Coenonympha pamphilus* *in copula* whilst walking through the grass. They flew for a few yards before finally alighting on a horizontal grass stem. The female faced east-north-east and the male which was directly beneath her faced in the same direction. I noticed that the female carried the male whilst in flight. Through out the whole time that they were *in copula* both of their wings were kept tightly closed and the only movements came from puffs of wind and when they changed their positions with the sometimes hazy then bright sunshine. At 15.50 there was slight movement when they changed position with the female facing due north and its mate facing

north-north-east. At 16.06 hours there was again slight movement when the male moved position to face north-north-west. At 16.12 hours they separated and both opened their wings for the first time. The male moved north up the stem and after twenty seconds flew off whilst the female moved south down the stem and departed ten seconds later. They had remained *in copula* for one hour one minute.

Table 1 shows the durations, in order of time spent *in copula*, for the 17 species that I have observed over the last twenty years. An asterisk (*) denotes a species in which the actual mating to the time of separation was observed.

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BOOK REVIEWS

North West Wales Lepidoptera Report 2003 (Adroddiad Lepidoptera Gogledd Orllewin Cymru) compiled by **John Harold & Andrew Graham**. 196 pp. A4, comb-bound. Published with financial support from Butterfly Conservation North Wales and North Wales Wildlife Trust. Supplied free to contributors of records; non-contributors obtain copies from John Harold, Hen Ardd, Carreg y Gath, Rhiwlas, Bangor, Gwynedd LL57 4HD.

This is the third volume in the annual series reporting moths in Vice-counties 48 (Merionethshire), 49 (Caernarfonshire) and 52 (Anglesey), previous issues covering the years 2001 and 2002 (the volume covering 2004 is currently in preparation). A short introductory section in both English and Welsh precedes the report accounts for the year. The report includes records of 852 species of moths from 48 families and is essential reference for anyone at all interested in the moths of this interesting part of the British Isles.

